

CHAPTER 3

LAYING, HANDLING, SHOP, HUNTING, AND MECHANICAL SWEEP MINES

LEARNING OBJECTIVES

Upon completing this chapter, you should be able to do the following:

1. Describe the different types of laying mines.
2. Describe the various components used to assemble laying mines.
3. Describe the different types of handling, shop, hunting, and mechanical sweep mines.

The mine exercise and training and evaluation program is designed to provide a constant evaluation of the personnel, weapons systems, and associated equipment. This chapter discusses other exercise and training mines used in this program.

LAYING MINES

Laying mines or laying destructors (DST) are exercise and training (ET) configurations that are used by aircraft and submarine crews to practice mine planting techniques. They evaluate the personnel and the delivery agents in the laying of a mine field. Their cases or explosive sections, as appropriate, are inert loaded to service weight. Except for a weighted instrument rack or a search-coil tube that maintains center of gravity (CG) characteristics, the cases of laying mines contain no internal components. Laying mines are painted orange and white, either white with orange stripes or orange with white stripes.

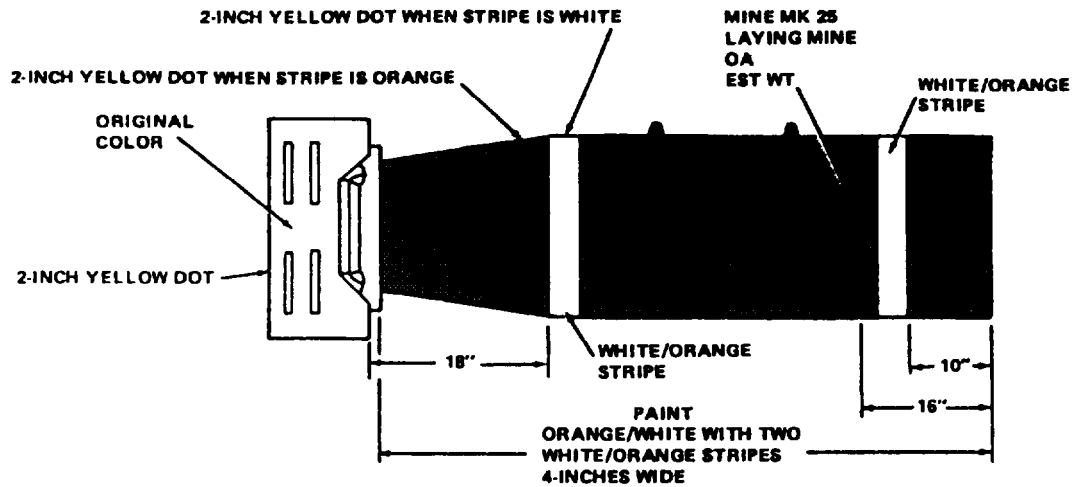
As a Mineman, you will need to know the different types of laying mines and their uses. This section describes the different types of laying mines.

For further information on the description and assembly of laying mines and their components, refer to *Mines, Underwater: Laying; Description, Assembly, and Disassembly*, NAVSEA SW550-AE-MMI-050; and *Mines, Underwater: Exercise and Training; Description and Class-B Criteria*, NAVSEA SW550-AE-MMI-010.

MK 25 LAYING MINE

The Mk 25 laying mine, shown in figure 3-1, is a recoverable, inert-loaded mine case, with a nominal weight of 2,000 pounds. Since a laying mine does not contain target detecting or actuating mechanisms, to maintain the CG and the inertial and ballistics characteristics identical to its service-mine version, the Mk 25 laying mine has concrete in the search coil tube and in the firing mechanism compartment,

If the Mk 25 laying mine is to be recovered, a Mk 87 sonar transmitter is installed in the instrument compartment. For the transmitter to function, a tail cover with four 1/2-inch holes drilled through it is used. The holes allow sea water to enter the instrument compartment to activate the transmitter.



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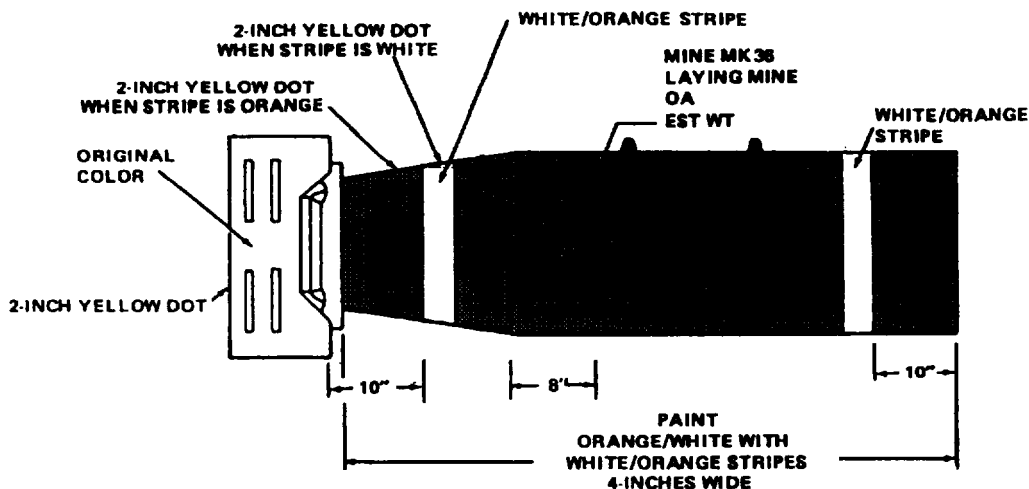
Figure 3-1.—Mk 25 laying mine.

A rubber expanding plug must also be installed in the hydrostatic switch and extender-well conduit to confine the flooding of the mine case to only the instrument compartment.

MK 36 LAYING MINE

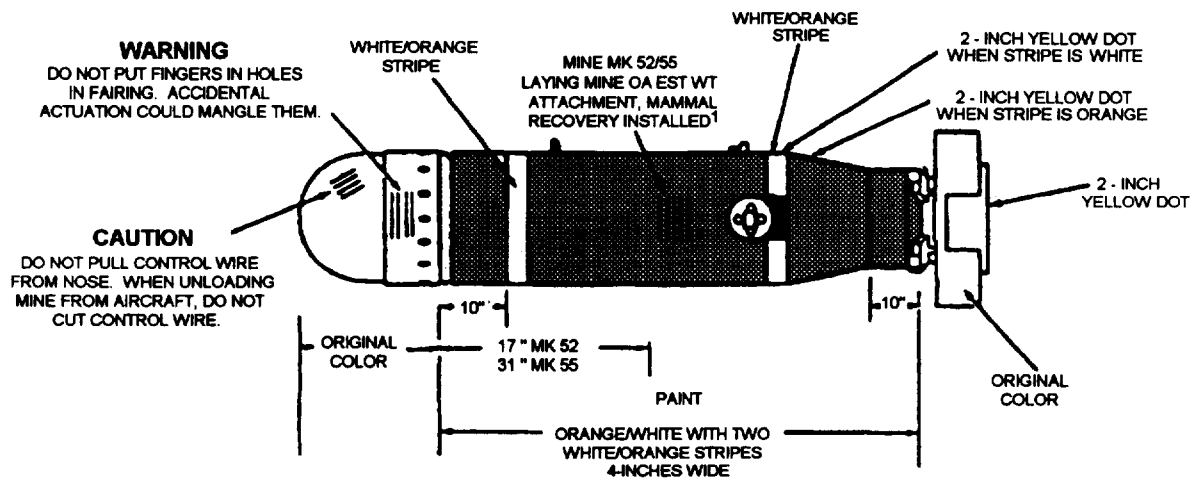
The Mk 36 laying mine, shown in figure 3-2, is a recoverable, inert-loaded mine case, with a nom-

inal weight of 1,000 pounds. The Mk 36 simulates the laying mine characteristics of Mk 52 service mines. Like the Mk 25 laying mine, the search coil tube and the instrument compartment are filled with concrete and the Mk 87 sonar transmitter is located inside the instrument compartment, which is flooded by the four 1/2-inch holes drilled into the tail cover.



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Figure 3-2.—Mk 36 laying mine.



¹ THIS STENCIL IS REQUIRED FOR UNITS EMPLOYING THE ATTACHMENT, MAMMAL RECOVERY

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Figure 3-3.—Mk 52 and Mk 55 laying mines.

MK 52 AND MK 55 LAYING MINES

The Mk 52 and Mk 55 laying mines, shown in figure 3-3, are inert-loaded shapes identical in size and weight to their service mine counterparts. The Mk 52 has a nominal weight of 1,000 pounds, and the Mk 55 weighs 2,000 pounds. The mines are identical other than size and flight gear.

There are three versions of the Mk 52 and Mk 55 laying mines: one has a locator float tail cover, one has a mammal recovery attachment, and one has the standard three-hole tail cover.

The laying mine with the locator float tail cover has a special tail cover with a locator float well that houses an ejection spring and an orange-colored locator float, all held in the tail cover by the flight gear assembly. Inside the buoyant locator float is a cylinder of coiled float line. One end of the float line is attached to a ring on the tail cover and the other end is secured to the inside bottom of the buoyant float. As the float rises to the surface, the float line is pulled out of the float container.

The laying mine with the mammal recovery attachment contains two components: an extensively modified tail cover and a transmitter holder. An additional sonar transmitter is installed. The modified tail cover has an 8-inch diameter ring welded to the top of the gussets. The sonar transmitter is installed in the transmitter holder at the bottom of the float well. The system allows trained sea lions, equipped with grabber mechanisms, to recover laying mines. The standard version of the Mk 52 and Mk 55 laying mines that use the standard three hole-tail covers does not employ any recovery/locating features.

The Mk 87 sonar transmitter is optional for the Mk 52 and Mk 55 laying mines employing the standard three-hole tail covers and the locator float tail cover. When used, the transmitter is installed on the tail cover of the mine. When using the mammal recovery attachment, the use of the Mk 87 sonar transmitter is mandatory. For this version, the Mk 87 sonar transmitter is mounted in the arming device well. In addition, when using the mammal recovery attachment, a 9-kHz sonar transmitter is installed in the float well of the modified tail cover.

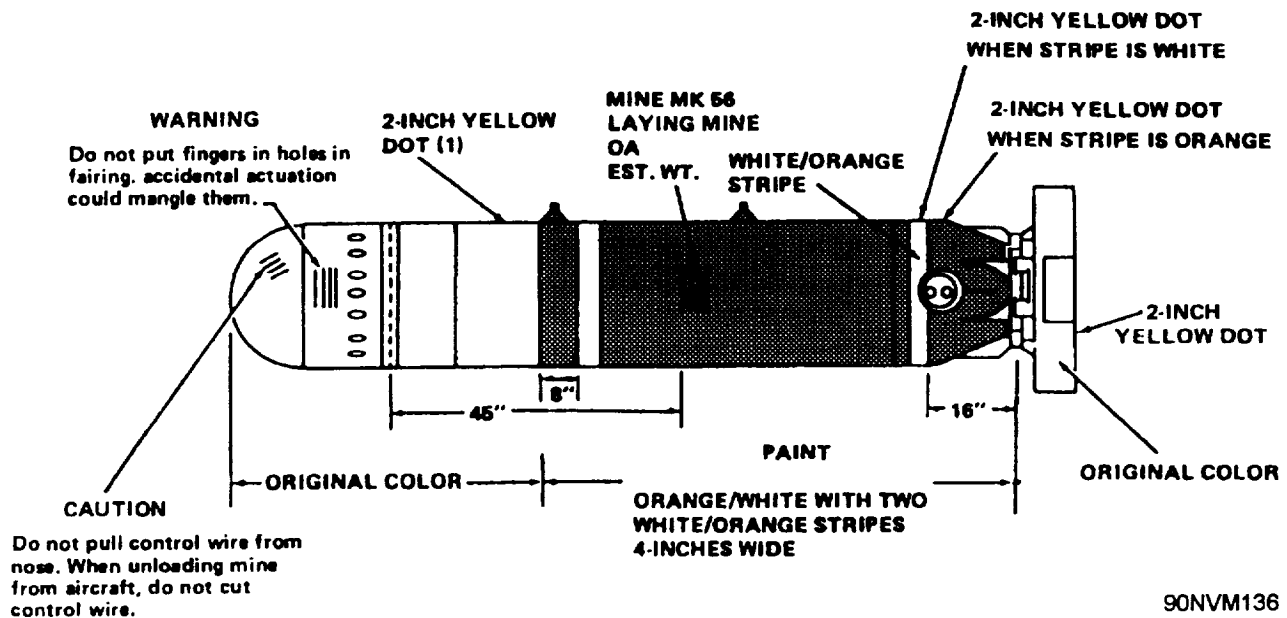


Figure 3-4.—Mk 56 laying mine.

MK 56 LAYING MINE

The Mk 56 laying mine, shown in figure 3-4, is a recoverable, inert-loaded shape identical in weight and size to the service mine counterpart. The Mk 56 laying mine has a nominal weight of 2,000 pounds and consists of a nonfunctional anchor, a mechanism section, an inert-loaded explosive section, an empty arming device, and service-mine flight gear. Since the anchor is nonfunctional, the mine does not separate or moor the buoyant mechanism section.

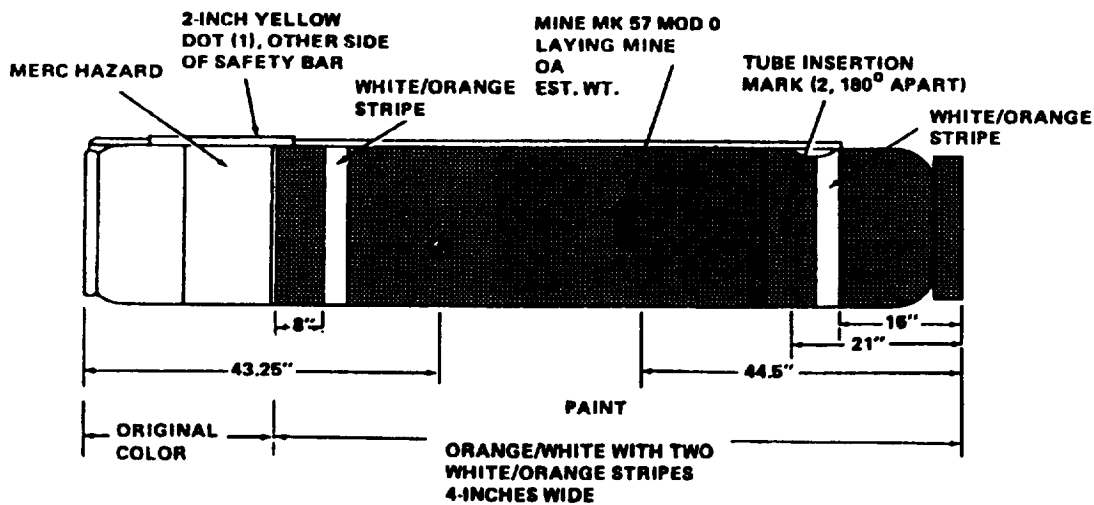
The Mk 56 laying mine does not have a target detecting mechanism, so it is ballasted to maintain weight, CG, and inertial and ballistics characteristics to its service-mine version. This is accomplished by the use of a concrete-filled instrument rack.

To simulate the same weight distribution as to the service mine rack, a steel block is installed in the rack. If the mine is to be recovered, a Mk 87 sonar transmitter is installed on the anchor.

MK 57 LAYING MINE

The Mk 57 laying mine, shown in figure 3-5, is a recoverable, inert-loaded shape identical in size and weight to the service mine. It is designed solely for the training of submarine crews in the techniques of carrying mines and planting mine fields. It has a nominal weight of 2,000 pounds and consists of a modified functioning anchor, a mechanism section, an inert-loaded explosive section, and an empty arming device.

The Mk 57 laying mine does not have a target detecting mechanism; therefore, it is ballasted to maintain weight and CG characteristics identical to its service-mine version. This is accomplished by a concrete-filled instrument rack. Like the Mk 56 laying mine, it has a steel block installed in the rack. The Mk 87 sonar transmitter is installed on the anchor to aid in the recovery of the anchor. The transmitter emits signals to locate the anchor so that a diver can attach a recovery cable.



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Figure 3-5.—Mk 57 laying mine.

MK 60 LAYING MINE

The Mk 60 laying mine, shown in figure 3-6, is a recoverable, exercise and training mine identical in size and shape to the service-mine counterpart. The Mk 60 laying mine is designed to train aviation and submarine personnel in the techniques of carrying mines and planting mine fields. It has a nominal weight of 2,000 pounds and consists of an inert-loaded mine case and service flight gear.

The Mk 60 exercise and training mine is issued to the fleet in two operational assemblies (OAs): air launched (OA 01) and submarine launched (OA 02). The Mk 87 sonar transmitter is installed on the rear cover of the mine case.

MK 62 AND MK 63 LAYING MINES

The Mk 62 and Mk 63 laying mines, shown in figures 3-7 and 3-8 respectively, are inert-loaded 500-pound and 1,000-pound general-purpose bombs. They incorporate an inert-loaded Mk 32 arming

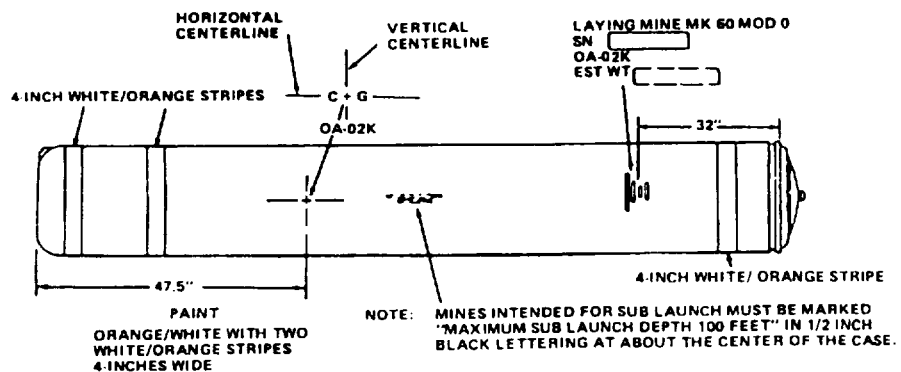
device, a nonoperational Mk 42 firing mechanism, and fully operational fins or tail sections. To facilitate the recovery operation, the mines are equipped with Mk 87 sonar transmitters.

MK 65 LAYING MINE

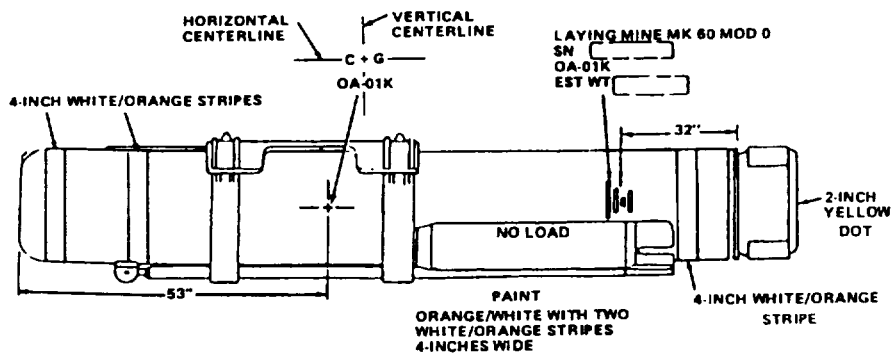
The Mk 65 laying mine, shown in figure 3-9, is a recoverable, inert-loaded shape identical in size and shape to its service-mine counterpart. It has a nominal weight of 2,000 pounds and consists of a mine case, a fairing, a Mk 144 Mod 0 thermal battery, a safety device, and a Mk 7 Mod 1 tail section.

MK 36 AND MK 40 LAYING DESTRUCTORS

The Mk 36 and Mk 40 laying destructors (DSTs), respectively, are 500-pound and 1,000-pound, inert-loaded, general-purpose bombs. They incorporate an inert-loaded Mk 32 arming device, a nonoperational Mk 42 firing mechanism, and fully operational fins or tail sections. To facilitate recovery operations, they are equipped with the Mk 87 sonar transmitter.



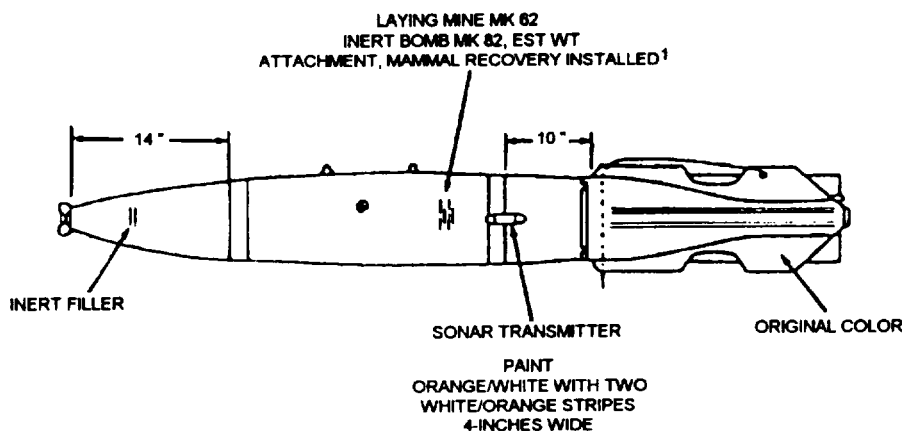
A. SUBMARINE LAUNCH



B. AIRCRAFT LAUNCH

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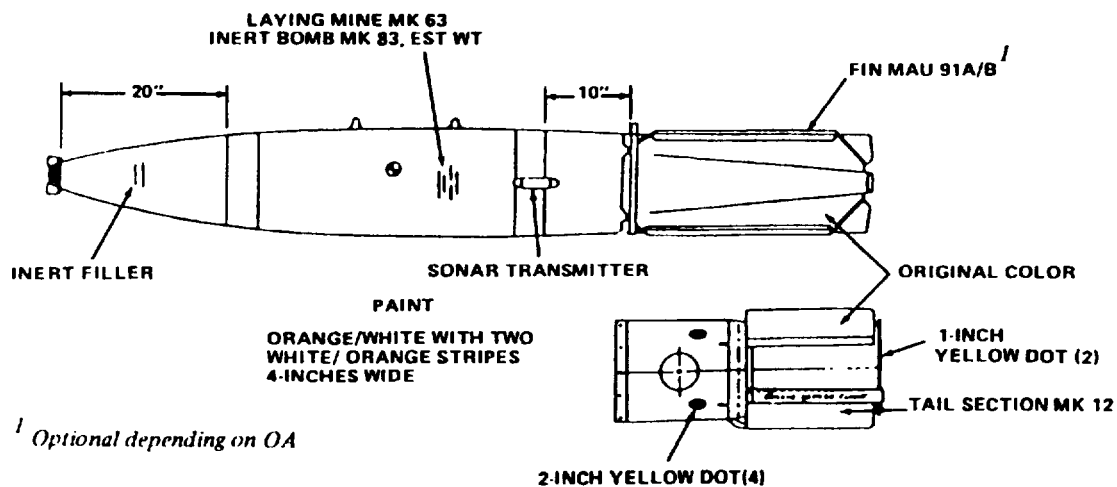
Figure 3-6.—Mk 60 laying mine.



1 THIS STENCIL IS REQUIRED FOR UNITS EMPLOYING THE ATTACHMENT, MAMMAL RECOVERY

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Figure 3-7.—Mk 62 laying mine.



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Figure 3-8.—Mk 63 laying mine.

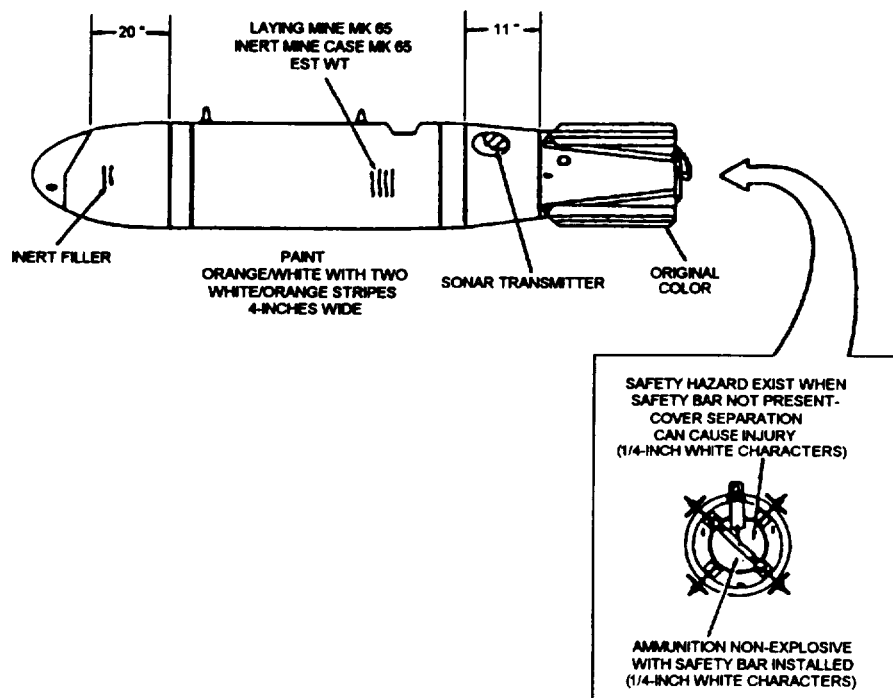


Figure 3-9.—Mk 65 laying mine.

LAYING MINE COMPONENTS

A laying mine contains no internal components, except for a weighted instrument rack or a search-coi I tube that maintains CG characteristics. The Mk 52 and Mk 55 cases may also employ an optional mine-locator float, which installs on the tail cover. A laying mine or a DST incorporates functional flight gear (when applicable) and all components that interface with the planting vehicle. This section describes these components and how they are used in laying mines.

SUSPENSION LUGS

Mk 3, Mk 12, Mk 13, Mk 17, and MS3314 Suspension lugs may be reused for all flight operations if, upon inspection, they exhibit no damage to their threads or to the suspension arch.

SONAR TRANSMITTERS

The Mk 87 sonar transmitter is the most commonly used transmitter. Depending on the laying mine, the Mk 87 transmitter may be installed externally in the arming device well, on the tail cover, or on the side of the bomb case. When the mammal recovery attachment is used on laying mines, an additional sonar transmitter (9-kHz Dukane Model N15A260) is used with the Mk 87.

ARMING DEVICES

The arming devices used on laying mines are identical to those used on their service-mine counterparts. However, they are inert-loaded.

TAIL COVERS

The tail covers for the Mk 25 and Mk 36 laying mines have four 1/2-inch holes drilled through them to allow water entry to activate the Mk 87 sonar transmitter. The Mk 52 and Mk 55 laying mines use tail covers that have a circular steel plate measuring 18 inches in diameter. The plate has a single well welded to the center of the cover,

measuring 11 13/16 inches deep and 8 13/64 inches in diameter, which is used to accommodate a float.

MINE LOCATOR FLOAT

The mine locator float, shown in figure 3-10, is used on the Mk 52 and Mk 55 laying mines. The unit installs in the well of the mine's tail cover and functions as a surface marker for locating and recovering the mine after planting.

The float itself is a polyethylene container 11 inches high and 8 inches in diameter. The container includes a 2-inch-diameter plastic tube with 200 feet of nylon twine. The space surrounding the cavity for the plastic tube is filled with urethane foam. A plastic cover with a feeder hole for the nylon line secures the contents of the container in place.

Connected to the nylon line and external to the container is an 18-inch length of wire rope, called a leader. The free end of the leader includes a shackle, which attaches to the mine's tail cover. The leader functions as a umbilical cord. The plastic tube and the leader are called the line assembly. They are also a part of a replacement parts kit that permits the locator float to be refurbished for reuse.

Additional components of the float include an 8 1/8-inch-diameter polyurethane cushion, an 8 1/8-inch-diameter fiberboard spacer, a coiled spring, three spring clamps, three screws, and three lock washers. The coiled spring and the spacer install beneath the float in the well of the mine's tail cover; clamps, screws, and lock washers hold the spring in place. The cushion installs over the float and is held in place by the mine's flight gear, which also secures the float in the tail cover.

The mine locator float operates as follows: At water impact and upon release of the flight gear, the coiled spring ejects the float from the tail cover. As the mine sinks to the bottom, the nylon line (secured by the leader to the tail cover) pays out, permitting the float to surface and to mark the location of the submerged mine.

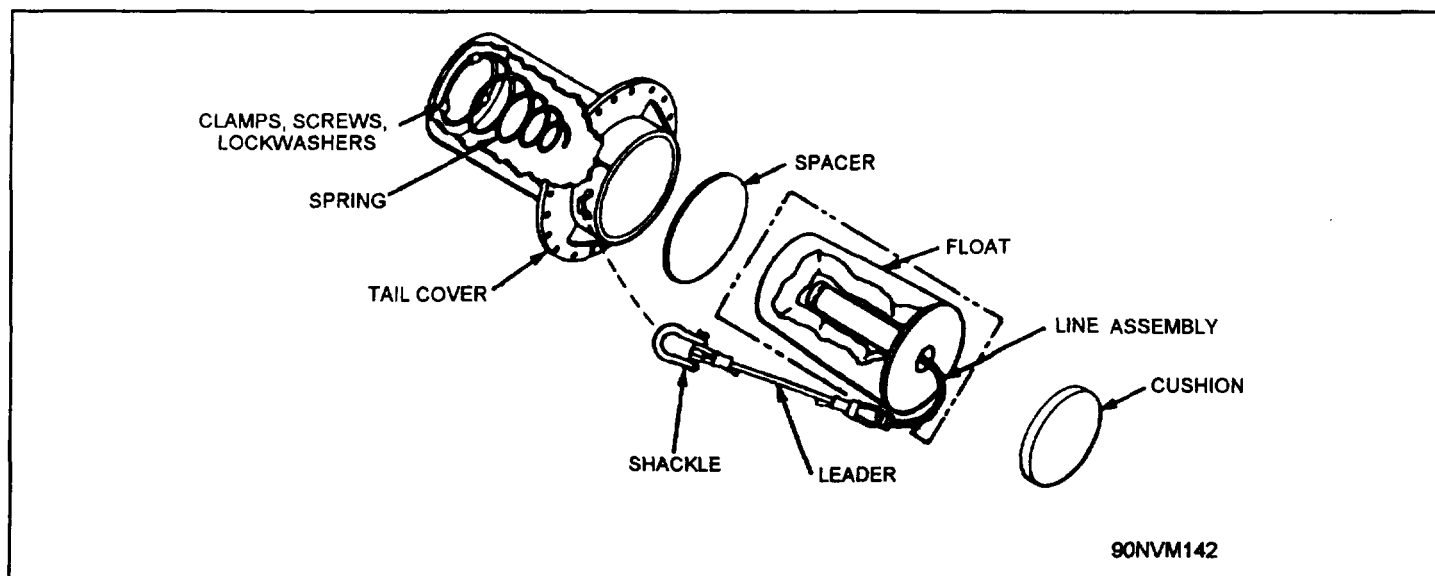


Figure 3-10.—Mine locator float.

FLOAT ASSEMBLY

The float assembly, shown in figure 3-11, is used in the Mk 65 laying mine. It is cylindrical in shape, 6 1/2 inches in diameter and approximately 13 1/2 inches long. The housing is polyethylene foam, which provides buoyancy. The assembly includes a float line attached to the housing and a rapid repair link for attaching the float line to the eyebolt mounted in the float container. This assembly is released when the tail section separates upon water impact. The float assembly is used to locate the laying mine for recovery after deployment exercises.

FLIGHT GEAR

The flight gear used on laying mines is Code A fully functional. The parachute packs use a Mk 112 control unit and a Mk 18 actuator to deploy the parachute after release from the aircraft.

HANDLING, SHOP, HUNTING, AND MECHANICAL SWEEP MINES

To provide proficiency in the loading and planting of mines, we use laying mines. To provide

proficiency in the handling, assembly, hunting, and sweeping of mines, we use mines specifically designed for those reasons. This section describes these mines.

For additional information on the description and assembly of these mines, refer to *Mines, Underwater: Handling, Shop, Mechanical Sweep, and Hunting; Description and Assembly*, NAVSEA SW550-AE-MMI-060.

HANDLING MINE

A handling mine is used to train aircraft and submarine crews in the techniques of mine handling and loading on board. Its case is inert loaded to service weight and contains no internal components, except for a weighted instrument rack used to compensate for weight and CG characteristics.

Externally, the case is fitted with flight gear (when applicable) and all components that interface with the planting vehicle. A handling mine contains no sonar transmitter or explosives and its flight gear is nonfunctional. The handling mine is painted bronze.

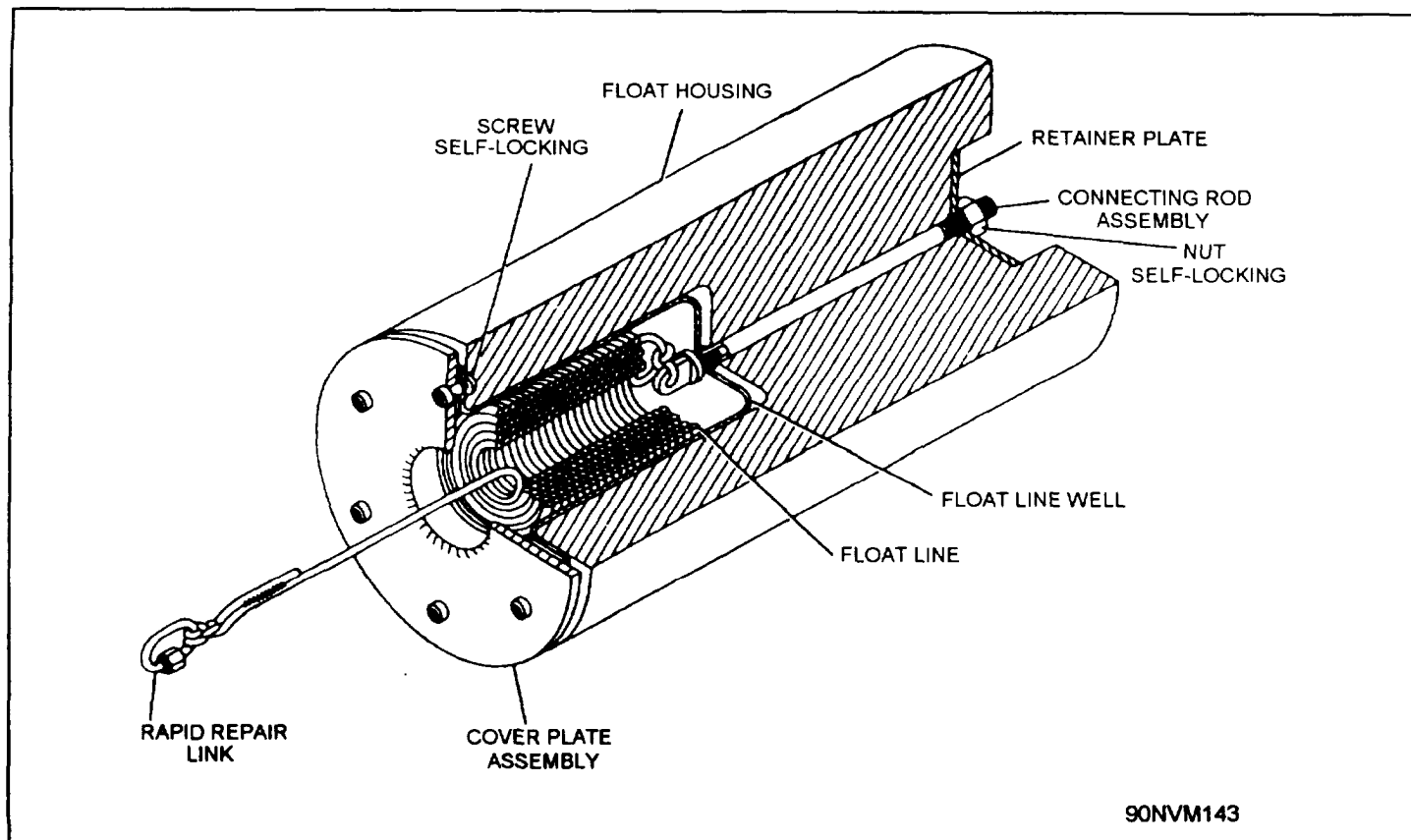


Figure 3-11.—Float assembly.

SHOP MINE

A shop mine is used for instructional purposes and to develop proficiency in mine assembly and testing. Its case is inert-loaded and contains all components necessary to constitute a fully assembled mine. However, dummy or inert loads are substituted for explosive components. The shop mine is painted blue.

HUNTING MINE

A hunting mine is used by mine locating personnel to develop proficiency in the techniques

of mine hunting. Since the purpose of a hunting mine is only to provide a planted shape, any inert laying mine may be used to serve this purpose.

MECHANICAL SWEEP MINE

A mechanical sweep mine, shown in figure 3-12, is an inert-loaded Mk 6 moored mine without actuation mechanisms. It is used for developing proficiency in mechanical minesweeping techniques. The case of the mechanical sweep mine is painted orange with a white stripe. The anchor is painted black.

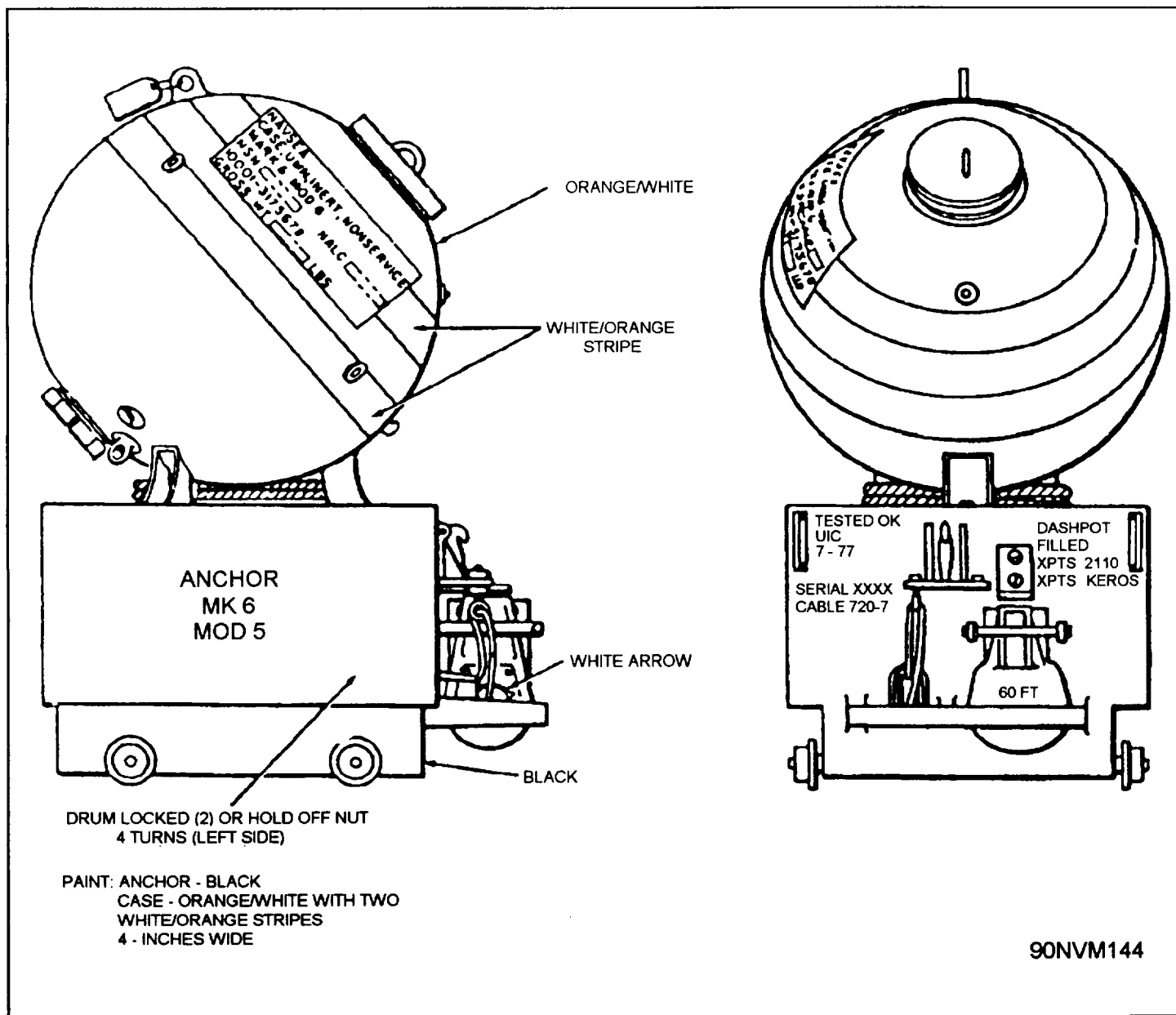


Figure 3-12.—Mk 6 mechanical sweep mine.

RECOMMENDED READING LIST

NOTE: Although the following references were current when this TRAMAN was published, their continued currency cannot be assured. Therefore, you need to ensure that you are studying the latest revision.

Mines, Underwater: Exercise and Training; Class-B Test and Refurbishment, NAVSEA SW550-AE-MMI-020, Naval Sea Systems Command, Washington, D.C., 1989.

Mines, Underwater: Exercise and Training; Description and Class-B Criteria, NAVSEA SW550-AE-MMI-010, Naval Sea Systems Command, Washington, D.C., 1989.

Mines, Underwater: Handling, Shop, Mechanical Sweep, and Hunting; Description and Assembly, NAVSEA SW550-AE-MMI-060, Naval Sea Systems Command, Washington, D.C., 1990.

Mines, Underwater: Laying; Description, Assembly, and Disassembly, NAVSEA SW550-AE-MMI-050, Naval Sea Systems Command, Washington, D.C., 1990.